s18: EXP LOG (SLTN v310)
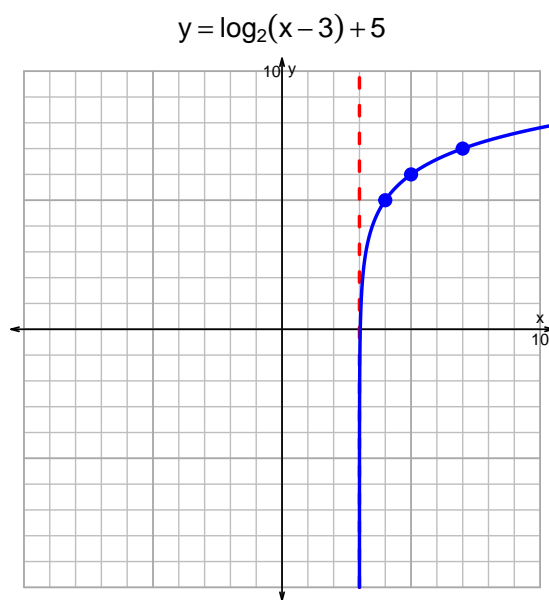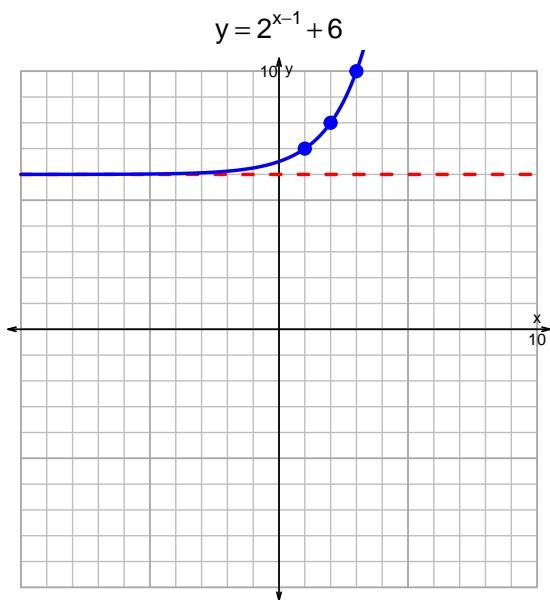
1. (10 pts) Graph $y = 2^{x-1} + 6$ and $y = \log_2(x - 3) + 5$ on the grids below. Also, draw any asymptotes with dashed lines.

Somewhat useful hint: $2^3 = 8$, and thus $\log_2(8) = 3$.

2. (10 pts) Write (but do not evaluate) the solution to the equation below by writing a logarithmic expression. Please do not do any arithmetic; just move numbers around.

$$-19 = \left(\frac{-4}{5}\right) \cdot 2^{7t/3}$$

Divide both sides by $\frac{-4}{5}$.

$$\frac{19 \cdot 5}{4} = 2^{7t/3}$$

Take log, base 2, of both sides.

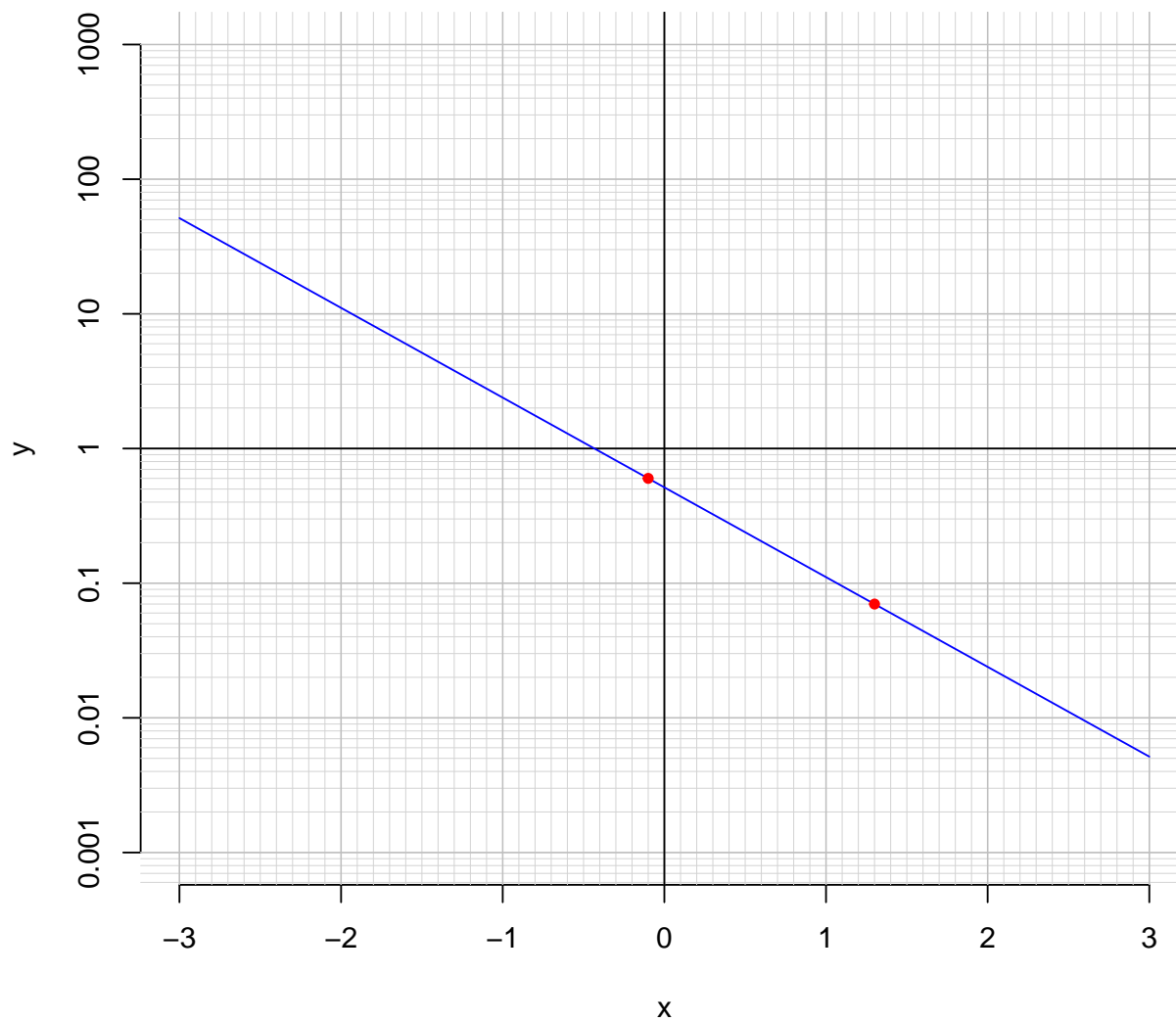$$\log_2\left(\frac{19 \cdot 5}{4}\right) = \frac{7t}{3}$$

Divide both sides by $\frac{7}{3}$.

$$\frac{3}{7} \cdot \log_2\left(\frac{19 \cdot 5}{4}\right) = t$$

Switch sides.

$$t = \frac{3}{7} \cdot \log_2\left(\frac{19 \cdot 5}{4}\right)$$

3. (10 pts) An exponential function $f(x) = 0.515 \cdot e^{-1.53x}$ is graphed below on a semi-log plot.

a. Using the plot above, evaluate $f(1.3)$.

$$f(1.3) = 0.07$$

b. The inverse function is logarithmic.

$$f^{-1}(x) = \frac{-1}{1.53} \cdot \ln\left(\frac{x}{0.515}\right)$$

Using the plot above, evaluate $f^{-1}(0.6)$.

$$f^{-1}(0.6) = -0.1$$